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We Claim:

1. A method of treating Type I or Type II diabetes in a mammal in need thereof comprising implanting a cell line transformed with a vector comprising a promotor driving expression of a DNA sequence encoding a protein of the formula:

His-Xaa¹-Glu-Gly-Thr-Phe-Thr-Ser-Asp-Val-Ser-Ser-Tyr-
Leu-Xaa²-Gly-Gln-Ala-Ala-Xaa³-Xaa⁴-Phe-Ile-Ala-Trp-Leu-
Val-Lys-Gly-Arg-Xaa⁵ (SEQ ID NO 1)

10 wherein

Xaa¹ is Ala, Gly, Val, Thr, and Ile;

Xaa² is Glu, Gln, Ala, Thr, Ser, and Gly;

Xaa³ is Lys, and Arg;

Xaa⁴ is Glu, Gln, Ala, Thr, Ser, and Gly; and,

15 Xaa⁵ is Gly-OH or is absent;

into said mammal such that it is immunologically isolated from the mammal's immune system and secretes a protein of SEQ ID NO. 1 into said patient.

20 2. A method of treating Type I or Type II diabetes in a mammal in need thereof comprising implanting a cell line transformed with a vector comprising a promotor driving expression of a DNA sequence encoding a protein of SEQ ID NO 1 into said mammal wherein said mammal is under
25 immunosuppression therapy.

30 3. The method of Claims 1 or 2 wherein Xaa¹ is Ala or Val, Xaa² Glu, Xaa³ is Lys or Arg, Xaa⁴ is Glu, and Xaa⁵ Gly-OH or is absent.

4. The method of Claims 1 or 2 wherein Xaa¹ is Ala, Xaa² Glu, Xaa³ is Lys, Xaa⁴ is Glu, and Xaa⁵ Gly-OH.

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5. The method of Claims 1 or 2 wherein Xaa¹ is Val, Xaa² Glu, Xaa³ is Lys, Xaa⁴ is Glu, and Xaa⁵ Gly-OH.

5 6. The method of Claims 1 or 2 wherein the promotor is a viral promotor.

7. The method of Claims 1 or 2 wherein the promotor is a metallothionein promotor.

10 8. The method of Claims 1 or 2 wherein the DNA coding sequence is

5' - CAT GCT GAA GGG ACC TTT ACC AGT GAT GTA AGT TCT TAT TTG
GAA GGC CAA GCT GCC AAG GAA TTC ATT GCT TGG CTG GTG AAA
15 GGC CGA GGA - 3'. (SEQ ID NO 2)

9. The method of Claims 1 or 2 wherein the DNA coding sequence is

5' - CAT GTT GAA GGG ACC TTT ACC AGT GAT GTA AGT TCT TAT TTG
20 GAA GGC CAA GCT GCC AAG GAA TTC ATT GCT TGG CTG GTG AAA
GGC CGA GGA - 3'. (SEQ ID NO 4)

10. The method of Claims 1 or 2 wherein the cell line is the human embryonal kidney cell line 293 transformed
25 with a vector selected from the group consisting of pGT-h+tLB+GLP-1, pGT-h+tLB+Val8GLP-1, or pMT-h+tLB+Val8GLP-1.

11. The method of Claims 1 or 2 wherein the cell line is the human embryonal kidney cell line 293 transformed
30 with the vector pGT-h+tLB+GLP-1.

12. The method of Claims 1 or 2 wherein the cell line is the human embryonal kidney cell line 293 transformed with the vector pGT-h+tLB+Val8GLP-1.

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13. A method of treating Type I or Type II diabetes in a mammal in need thereof comprising injecting an expression vector of any one of Claims 1 to 12 directly into the mammal such that the expression vector is incorporated into a cell of the mammal and secretes a protein of SEQ ID NO. 1.

14. A stable transformed cell line of any one of Claims 1 to 12.

15. A vector of any one of Claims 1 to 12.

16. A method of treating Type I or Type II diabetes in a mammal in need thereof comprising implanting a cell line transformed with a vector comprising a promotor driving expression of a DNA sequence encoding a protein of the formula:

His-Xaa¹-Glu-Gly-Thr-Phe-Thr-Ser-Asp-Val-Ser-Ser-Tyr-
Leu-Xaa²-Gly-Gln-Ala-Ala-Xaa³-Xaa⁴-Phe-Ile-Ala-Trp-Leu-
Val-Lys-Gly-Arg-Xaa⁵ (SEQ ID NO 1)

wherein

Xaa¹ is Ala, Gly, Val, Thr, and Ile;
Xaa² is Glu, Gln, Ala, Thr, Ser, and Gly;
Xaa³ is Lys, and Arg;
Xaa⁴ is Glu, Gln, Ala, Thr, Ser, and Gly; and,
Xaa⁵ is Gly-OH or is absent;

into said mammal such that it is immunologically isolated from the mammal's immune system substantially as hereinbefore described with reference to any one of the Examples.

17. A vector encoding a protein of SEQ ID NO 1 substantially as hereinbefore described with reference to any one of the Examples.

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18. A stable mammalian cell line transformed with a ~~vector~~ capable of secreting a protein of SEQ ID NO 1 substantially as hereinbefore described with reference to any one of the Examples.

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